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COMMUNICATIONS

TRACHOMA IN THE BRITISH COLONIAL EMPIRE.— ITS RELATION TO BLINDNESS; THE EXISTING MEANS OF RELIEF; MEANS OF PROPHYLAXIS*

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I PROPOSE to deal with this subject, "Trachoma in the British Colonial Empire," geographically, beginning with the self-governing Dominions, Newfoundland, Canada, Australia, New Zealand, and the Union of South Africa. Then the Indian Empire will be considered, and finally the Imperial Crown Colonies situated in Europe, Asia, Africa, America and Oceania.

Canada

Carefully thought out regulations are in force to prevent the entrance into the country of persons who are suffering from active trachoma.

All intending emigrants starting from the British Isles, Paris, Hamburg, Antwerp and Rotterdam are required to be medically examined prior to embarkation to satisfy the Canadian Government that they are not physically or mentally defective.

* A Report by A. F. MacCallan, Vice-President of the International Organization against Trachoma, read on May 14, 1934, in Paris, at the Joint Meeting of the International Organization against Trachoma, and of the International Association for the Prevention of Blindness.

Emigrants coming direct from countries where there are no Canadian immigration agencies, such as Denmark, etc., are subjected at the Canadian port of arrival to a medical examination of the same standard as that required prior to embarkation.

Persons suffering from a contagious disease such as trachoma are neither allowed to settle in Canada nor to pass through Canada in transit to other countries unless a cure is likely to be effected by treatment in a period not exceeding four or five weeks.

The published instructions to medical officers on the subject of the diagnosis of trachoma are of interest:—"Medical officers will

DOMINIONS

Name	Area in square miles	Population	Remarks
CANADA	3,684,463	10,376,786	Account given
NEWFOUNDLAND	162,750	263,000	No report
AUSTRALIA	2,974,581	6,623,754	Account given
NEW ZEALAND	105,155	1,602,414	Account given
UNION OF SOUTH AFRICA—			
Cape of Good Hope ...	276,966	2,782,719	Account given
Natal	35,284	1,429,398	Account given
Transvaal	110,450	2,087,636	Account given
Orange Free State	49,647	628,827	Account given
South-West Protectorate ...	322,393	227,739	Account given
Basutoland	11,800	500,000	No trachoma. 898 cases of conjunctivitis treated
Bechuanaland	275,000	153 000	44 cases of trachoma
Swaziland	6,700	113,000	No report

regard as trachoma any case wherein the conjunctiva presents firm, well-marked granulations which do not have a tendency to disappear when placed for some days under hygienic surroundings, or do not rapidly yield to ordinary treatment, even though there be no evidence of active inflammation, appreciable discharge, or degenerative or destructive processes, at the time of the examination. They will also regard as possible trachoma any case which presents an active inflammatory condition of the conjunctiva accompanied by a discharge or thickened infiltrated condition of the lids, and hold such a case until by treatment or otherwise the examination may be concluded satisfactorily. Cases presenting an acute inflammation with a granular appearance should be held as suspicious, and kept under observation for a period necessary to arrive at a definite diagnosis."

"Any condition in which granulation and discharge are present, but which readily disappear on treatment, shall not be regarded as trachoma."

"The formation of scar tissue distinguishes trachoma from all other diseases of the conjunctiva, not dependent on traumatism. In all other inflammations the conjunctiva returns to normal, leaving no traces behind it. In trachoma the presence of cicatricial tissue is evidence of nature's process of cure in those areas at least."

"When an emigrant has been certified for trachoma and is found on re-examination to be 'apparently cured' after all treatment has ceased, such emigrant shall be deferred for six months and then re-examined, and if still 'apparently cured' be passed."

"No case having suffered from trachoma shall be shown as 'apparently cured' until all evidence of the disease has been completely eradicated. The diseased conjunctiva must be replaced by white scar tissue, the lids having regained their elasticity and the infiltration causing thickening having disappeared."

"In persons of advanced years there is sometimes a condition of amyloid or hyaline degeneration following trachoma or other chronic infection leaving a thickened lid which of itself is not certifiable. This must not be confused with trachomatous or infectious infiltration."

"In the case of continental emigrants the port medical officer in Canada shall examine the eyes in order to assure himself that there is no trachoma present, since it is known from experience that old cases of this disease which may have been passed as cured, sometimes revive during an ocean voyage."

The above regulations, made by the Canadian medical authorities for the use of their medical officers who are not oculists, appear to be admirable.

Foci of trachoma in Canada.—There are a few unimportant foci of trachoma existing among Hebrew and Eastern European immigrants. The Indians, however, 122,911 in number, who have increased by 10 per cent. during the last 10 years, maintain an approximate trachomatous incidence of about 10 per cent. according to Gordon Byers, the distinguished ophthalmic surgeon. It is probable that this estimate is a highly conservative one. The last mentioned author states that the incidence of trachoma among the white population of Manitoba and Saskatchewan is serious.

At the Indian Residential Schools a definite treatment procedure has been adopted. This is not intended to take the place of the professional directions of an eye specialist, but is for use where the services of a specialist are not available. It is as follows:—

Diagnosis.—Trachoma is a chronic, communicable disease of the eye, beginning with a slight general inflammation and going on to the formation of small red granular growths on the inside

of the lids. The continued inflammation leads to the formation of scars, by which the lids are distorted. Ulcers sometimes form over the sight, leaving cloudy patches. By these means the sight is obscured. The disease is very persistent. Some cases recover in time, even without treatment, but many go on for years, and a certain number become blind. Trachoma spreads from person to person by means of towel, soap, fingers, or anything which may convey the tears or discharges from affected eyes to well ones. It does not spread without contact of some kind.

Principals should ask the Medical Attendant to advise them as to the presence of trachoma among the pupils of the school. Any case of persistent inflammation of the eye should be looked upon as trachoma unless the doctor is sure it is not. Every pupil must have and be trained to use his own towel and soap and no other, and to avoid putting the fingers up to his own eyes or to the eyes of other pupils.

A supply of antiseptic lotion (made up from tablets) is to be kept on hand. The solution is to be used in the following manner: The pupil, seated on a chair or at his school desk, is to lean backward and hold his own eye open with one finger of each hand. The teacher or nurse, using a ball-pointed dropper, is to drop two drops in each eye. The pupil is then to close the eyes while he may count 20, and move the eyeball about so at to distribute the solution thoroughly. This treatment is designed to prevent the spread of trachoma, and is to be given to the pupil every night and morning, subject to instructions contained in the ensuing paragraph. It is also recommended for the school staff. If any pupil is considered to be suffering from established trachoma the drops are not to be used, and the following treatment is to be used instead:—Small tubes of copper citrate ointment will be supplied by the Department in Ottawa. A separate tube is to be used for each pupil. The treatment is to be given just before the pupils go to bed for the night. The pupil stands in front of the teacher or nurse who will pull down the lower eyelid and squeeze on the inside of the lid a portion of the ointment as large as half a grain of wheat. The pupil then passes to bed, closes the eyes and moves the eyeballs about while he counts 20. No other treatment is authorized unless ordered by an eye specialist.

When the above mentioned treatment is carried out the nurse or teacher is to have at hand a basin of solution made by adding one teaspoonful of lysol to one quart of water. After handling the eyes of one pupil and before touching the next the fingers are to be rinsed and wiped on a towel.

Admissions to hospital.—Trachoma in itself is not considered a cause for admission to hospital. This does not forbid hospital treatment of acutely diseased eyes, whether the cause be trachoma

or otherwise, but the Department at present has not the facilities to provide the hospital treatment of trachoma as such.

These instructions have been very carefully prepared by the Director of Medical Services after consultation with a competent adviser on trachoma. *They are neither to be varied nor neglected.*

While this procedure is intended primarily for Indian Residential Schools it is also suitable for use in any other place where it can be applied.

Authorized supplies for each 100 pupils:—

Antiseptic eye lotion tablets	500
Copper citrate ointment tubes	50
Lysol, gallon	1
Eye droppers, ball pointed	24

Australia

In certain parts trachoma is prevalent. A number of trachoma cases were found among the Australian troops during the War. I have had patients in London who have come from Australia for operation on complications of trachoma. The disease is treated rather lightly in Australia where it is called "sandy blight."

Trachoma has been present in Australia to some extent since the early days of colonization, and has been observed as a condition of decreasing importance since then in all the larger centres of population and their neighbourhood.

Within the broad coastal areas devoted to agriculture and closer settlement, the disease has now practically ceased to exist. On the other hand, the history of Australia is curiously consistent in respect to the frequency of trachoma in each State during its first establishment, that is to say, when housing and living conditions were primitive, and diet was often poor in quality and irregular in supply.

Specific references occur in respect to Sydney (New South Wales), Melbourne (Victoria), Hobart (Tasmania), Adelaide (South Australia), Freemantle (Western Australia), and Brisbane and Rockhampton (Queensland).

As settlement became more permanent and the amenities of civilization developed, the disease showed definite limitation to the fringes of established settlement, and to such extent as it still does exist, this remains a generalization.

It is particularly found in the dry and dusty areas of Western and North-Western Queensland, Western New South Wales, North-West of Victoria, Northern South Australia, and the Eastern and North-Eastern parts of Western Australia, but the incidence of the disease is not high in any of these localities.

In these areas it appears to have little relation to housing and living conditions other than those affecting diet, but the areas of

incidence are usually those in which milk, greens and fruits are relatively scanty.

In no State, except Victoria (from October, 1933, only), is the disease notifiable, though as a problem of public health it is perhaps more important in Queensland and New South Wales.

In infected areas inspections of school children are made at short intervals by school medical staffs and travelling units. Public education in regard to prophylaxis proceeds along with this activity.

Facilities for change of environment to the coast exist in Queensland and elsewhere for affected children.

Compulsory notification by regulation has not been considered necessary for such areas as have been recorded.

Persons affected, on attempting to enter Australia, are prohibited under Section 3 (e) of the Immigration Restriction Act, 1901-1925.

New Zealand

Trachoma is a notifiable disease in New Zealand. Only four cases were notified in 1932. However, it is probable that owing to lack of knowledge of the disease many cases occurred which were not notified.

No adult or child suffering from trachoma would be allowed to land until a certificate from an ophthalmic surgeon had been produced, certifying that the disease had been absolutely cured.

South Africa

I have received information from the Secretary of Public Health, Pretoria, that trachoma was proclaimed a notifiable disease in the Union of South Africa in October, 1925.

Cases of the disease are not very common, the numbers that have been notified during the past eight years being as follows:—

Year ending June 30	Number notified	
	Europeans	Non-Europeans
1926	10	25
1927	13	15
1928	9	23
1929	11	32
1930	22	61
1931	6	19
1932	16	15
1933	9	27
	Total 96	Total 217

Indian Empire

Area, 1,900,000 square miles. Population, 352,000,000

Consideration of conditions in the Native States is omitted. The Provinces of British India are:—

Name	Area	Population	Remarks
Ajmer-Merwara	2,711	495,271	No report
Andamans and Nicobar ...	3,143	27,086	No report
Assam	55,014	7,459,128	75 per cent. of all eye cases seen at Rangoon General Hospital trachomatous
Baluchistan	54,228	420,648	Trachoma universal
Bengal	77,521	46,702,307	Account given
Bihar and Orissa ...	83 054	33,995,418	No report
Bombay	123,679	19,348,219	14.5 per cent. of all eye cases at Bombay Ophthalmic Hospital trachomatous
Burma	233,492	13,212,192	75 per cent. trachomatous
Central Provinces and Berar	99,920	13,912,760	No report
Coorg	1,593	163,838	No report
Delhi	573	488,452	Majority trachomatous
Madras	142,277	46,740,107	At Madras Gov. Ophthal. Hospital 1149 cases of trachoma healed in 1933
North-West Frontier ...	13,518	2,425,076	Trachoma universal
Punjab	99,265	23,560,852	Universal
Agra and Oudh	106,248	48,408,763	60 per cent. trachomatous

India

The Indian Empire consists of the Provinces of British India which are governed by the Governor-General, and the Indian States which are governed by princes under the suzerainty of the King-Emperor. The area and population of the Provinces is roughly about half that of the Indian States. The Provinces alone are considered in the present paper.

Trachoma is widely spread throughout India. In the Annual Report of the Public Health Commissioner with the Government of India, 1931, Vol. II, p. 36, there are some interesting paragraphs which also appear in War Office Report of the Health of the Army, 1931, Vol. LXVII, p. 121:—

"The most important work in this department has been the controlled enlistment of trachomatous recruits into the Indian Army. This has developed into an investigation into the nature and extent of the disease as met with in Northern India. The

results are:—(1) The disease is wide spread among certain classes, particularly Sikhs, among whom well over 90 per cent. are infected. (2) Infection starts in childhood, and in the majority progresses to reach a quiescent stage which produces little disability. (3) In the past large numbers have been enlisted and served as efficient soldiers throughout their colour service. (4) No evidence has been found to show that the disease is so infectious as to render the enlistment of these men a danger to their fellows or to the British troops serving with them.

During the year 621 trachoma recruits have been enlisted, and of these 65 have been discharged as incurable. A large proportion of these incurable cases was enlisted during the early stages of the experiment, when the type of case suitable for enlistment was not so clearly defined. With increased experience the later results have been more satisfactory."

However, two men of the British Army were admitted to hospital with trachoma according to the Annual Report of the Public Health Commissioner with the Government of India for 1932, Vol. II, p. 172.

In the Annual Report of the Public Health Commissioner with the Government of India, 1932, Vol. II, p. 62, with regard to recruiting for the Indian Army it is stated that out of 22,156 men presenting themselves for enrolment during the year ending March 31, 1932, 2,838 or 12·80 per cent. were rejected on account of trachoma. The Report continues as follows:—" The experiment referred to in last year's report in relation to the enlistment of recruits suffering from trachoma gave encouraging results, and was further extended. The evidence and experience acquired made clear the fact that little or no danger was likely to result from the recruitment of mild cases of trachoma; further the majority of these cases when placed under appropriate treatment responded readily. Instructions have since been issued permitting the enlistment in all recruiting centres of the following types of case:—

(*a*) Early cases in the " papillary " or " follicular " stage.

(*b*) Slightly more advanced cases where the tarsal glands are beginning to be involved.

Advanced cases are rejected as heretofore. The fact that such recruits suffer from trachoma on enlistment is noted on their medical sheets, and they are required to sign a certificate that they are willing to undergo a minor operation on their eyes if necessary. A strict watch is kept on the results of this measure and to date it clearly seems that no ill effects are occurring, and that many valuable recruits are secured who otherwise would not have been available."

In the War Office Report on the Health of the Army, 1932, Vol. LXVIII, p. 116, it is stated with regard to the Indian Army:

"The enlistment of recruits suffering from mild trachoma continues to give satisfactory results. The opinions of recruiting medical officers are in conformity with that of a distinguished ophthalmologist in civil practice, who writes:—'I can speak from 33 years' Indian experience and I am quite convinced that there are many mild cases of trachoma which are not only amenable to treatment, but which will eventually clear up without treatment. One sees hundreds of these cases each year. Regarding the contention that these are not cases of trachoma at all, but forms of chronic conjunctivitis, it is not possible to be dogmatic—for only experience can enable one to diagnose between early cases of trachoma, angular conjunctivitis and follicular conjunctivitis. But in my opinion it is perfectly safe to accept recruits with mild trachoma; in fact in some parts of India, especially in Sind, there are few eyes that do not show some signs of trachoma and yet give rise to no symptoms at all; and these signs are only found in apparently healthy eyes on everting the upper lid. If all recruits are rejected because they have some signs of mild trachoma, the field for recruiting will be enormously curtailed. Furthermore, in mild cases of trachoma at the age at which recruits are taken, the risk of infection is so small as to be almost negligible.'"

At Kohat in the North-West Frontier Province a school of 186 boys was examined where every boy below the age of 12 years was found to be infected. Whereas at Simla, on the heights of the Lower Himalayas, at a school of 1,300 boys only 3·1 per cent. were found to be infected.

In the Report of the Public Health Commissioner with the Government of India, 1929, p. 99, it is stated that in Burma in some of the schools 20 per cent. of the pupils suffer from trachoma and defective vision.

According to the Report of the Public Health Administration in the Punjab for 1932, p. 33, trachoma is so rife that "a pamphlet on the disease in English was printed and copies were freely distributed in schools through the Director of Public Instruction. An Urdu edition of the pamphlet is also under preparation and will also be distributed shortly through the same agency."

In India no clinics exist solely for the treatment of trachoma. The disease is treated gratuitously at ophthalmic hospitals and at all government hospitals and dispensaries. Compulsory treatment is an impossibility. Voluntary treatment is not very popular, since the usual treatment is painful and requires many attendances.

The course of the disease is said to be comparatively mild, and not to be subject to explosive outbreaks due to superadded infection, as is common in Egypt and Palestine.

Conditions of housing and living favour the spread of trachoma.

Over-crowding is universal among the poorer classes. The houses are insanitary and are insufficiently ventilated. Flies, smoke and dust abound in the peasant's dwelling, the disease in its earliest stage is always neglected, and the more advanced cases do not persist in treatment once comparative relief is obtained.

As one of the British military ophthalmic surgeons has written, "I cannot imagine how an anti-trachoma campaign could be carried out in this district (Lahore) which is full of communal troubles. There is no want of facilities for treatment, rather the reverse. What is needed is general sanitary education rather than any special anti-trachoma campaign."

An Indian medical officer writing from Lucknow says: "Looking into hospital records, a little over 60 per cent. are cases of trachoma. The special conditions prevailing here are the dusty nature of the streets, roads and villages, the extreme insanitary condition of our towns resulting in excessive breeding of flies, the economic cause, poverty, and above all the baneful social custom, the purdah."

While the Public Health Department of the Government of India have to expend annually so much energy and treasure in reducing the ill-effects of cholera, plague and malaria, all of which are constantly present, it is impossible to devote money—and thousands of laks of rupees would be required—to improve the ocular condition of the peoples of India, with their scores of religions, and their caste prejudices.

Medical inspection is provided in many of the Government and private schools. In many of them as many as 30 per cent. of the pupils are obviously under-nourished. Infant welfare centres are maintained in some of the large towns.

The Indian Red Cross Society is a flourishing institution carried on under the highest possible British Official and Indian patronage and management. Besides a monthly journal of 100 pages in English, the language in which communication is commonly established between the speakers of the 225 different languages (exclusive of dialects) of India, excellent illustrated brochures are published for the Junior Red Cross Section of the parent Society. Also illustrated posters in various vernacular languages are used to teach the elements of ocular hygiene.

Imperial Crown Colonies and Protectorates

Name	Area in square miles	Population	Report on eye diseases
EUROPE			
Malta	120	225,000	Account given
Gibraltar	2	22,000	Trachoma absent

Malta

Great care and interest in trachoma are observed by the Government Medical Department of Malta. There is no doubt that the disease was at one time practically universal among the poorer classes of the Maltese. Owing to the treatment adopted during the last 10 years ophthalmic conditions in the schools have greatly improved. In 1923, 1,282 marked cases were reported in the Government Schools, while in 1933 only 553 were signalized. Treatment is carried out at the Government Dispensaries, and also by District Nurses. It is important to note that during the long summer holidays treatment is still carried out for those who need it and can be persuaded to attend the Dispensaries. I should like to congratulate the Medical and Nursing Staff on their devotion to their work.

At the Ophthalmic Division of the Civil Hospital during 1933 200 cases of trachoma were treated as in-patients, and 632 cases as out-patients.

Asia

Name	Area in square miles	Population	Report on eye diseases
ASIA			
Ceylon	25,500	5,313,000	Government Health Report does not mention trachoma
Malaya—			
Straits Settlements ...	1,531	1,076,564	Trachoma common: Idegree of incidence uncertain
Fed. Malay States ...	27,648	1,713,096	
Johore	7,678	505,309	
Kedah	3,150	443,021	
Perlis	316	49,300	
Kelantan	5,713	362,517	
Trengganu	5,000	179,664	
Hong Kong	391	900,796	Uncertain: 46 immigrants refused admission on account of trachoma according to current report
North Borneo	31,000	270,223	No report
Brunei	2,500	30,000	No mention of eye diseases in Public Health Reports
Sarawak	50,000	600,000	
Cyprus	3,600	311,000	Account given
Palestine	9,000	800,000	Account given

Straits Settlements

At the Government Schools 54 cases of trachoma were detected and submitted to treatment at the general hospital and out-patient dispensary of Singapore. This is an apparent improvement on the condition of affairs in 1930 when 207 operations for trachoma were carried out.

It is probable that under expert examination the schools and the whole native population would be found to be heavily infected.

At Singapore there are five Government Health Sisters who visit native women. There is a Child Welfare Society, two children's clinics and a crèche.

Federated Malay States

There are five clinics for eye diseases where 8,823 patients were treated in 1933. It is said that 129 cases of trachoma were diagnosed. It is extremely improbable that the small number of cases diagnosed is any reliable measure of the degree of trachomatization of the general population. A serious attempt is made to teach social hygiene by means of lectures, etc.

Johore

No trachoma statistics available. Eye diseases, especially conjunctivitis, are treated by travelling motor dispensaries, 529 cases being treated in 1933. There are also a hospital and infant welfare centres.

Cyprus

Eye clinics are in existence at the principal towns, Nicosia, Larnaca, Limassol, and Famagusta. Also two travelling oculists are employed who treated 8,629 cases; while 2,312 cases were treated by honorary oculists. Practically the whole of the poorer population is trachomatous. Social hygiene work is carried on by a lady welfare officer. A health propaganda is carried on by means of cinematograph exhibitions.

Palestine

Palestine has the distinction of having a greater percentage of blind persons among her general population than any other country in the world. This is seen in the following list:—

Number of blind persons per 100,000 of population.

Palestine	843
(Blind in one eye ... 1,968)	
Egypt	776
Latvia	225
Turkey	197
British India	150
Italy	111
England	73
France	71
Germany	59
Holland	56

The question of this devastating amount of blindness in Palestine requires some consideration in relation to the country, its climate and its population.

The area of the country is about 9,000 square miles or 64,000 square kilometres, and may be divided into the district about Jerusalem, and the districts north and south of the Holy City. In the southern district there is practically no rainfall.

The population consists of about 70 per cent. Moslems, 20 per cent. Jews, and 10 per cent. Christians.

According to Shimkin there is now little or no trachoma among the children who frequent the better class Jewish schools in Jerusalem.

In the southern district with a population of 304,532 it was found that 28 per cent. were blind in one eye, and 11·3 per cent. were blind in both eyes. This very high percentage is related to the scarcity of water in the southern district, since for the whole of Palestine the percentage of blindness in one eye is 19·68 and for blindness in both eyes 8·43.

Of great importance in the determination of the cause of this appalling degree of blindness is the age of onset of the deterioration of vision.

There is a close association between age and the incidence of blindness; this is marked up to the age of 10 to 15 years both in boys and girls. Thereafter the incidence falls abruptly in boys, but in girls, at this, the marriageable age, it remains high until about 30 years.

The explanation of this is that up to the age of 10 to 15 years they are associating with other children who have acute conjunctivitis which infects them, and owing to the inflammation of the eyelids ulceration of the cornea occurs, resulting in blindness in a large proportion of cases.

In girls over 15 years marriage and child-birth is the usual lot. They associate with infected children to a greater extent than do the opposite sex and partake of the ocular dangers of the children.

In former days small-pox was a very frequent cause of blindness, but now, owing to the compulsory vaccination under British administration, this disease has ceased to exist in Palestine.

As in Egypt ophthalmia neonatorum in Palestine is an almost negligible cause of blindness.

Again, as in Egypt, the prime cause of the blindness is acute conjunctivitis. This is the result of the action of well-known bacterial organisms the most important of which are the gonococcus, the Koch-Weeks bacillus, the Morax-Axenfeld bacillus, the pneumococcus, and the staphylococcus.

It is important to supply an answer to the question "Is trachoma a cause of blindness?" Uncomplicated trachoma is a mild hyperaemic state of the lining membrane of the eyelids, that is of the conjunctiva and subconjunctival tissue. It may cause very little discomfort. In a trachomatous country it is necessary to evert the upper eyelid of every person whom it is desired to state to be free from trachoma. Trachomatous infiltration of the superficial layers of the cornea occurs very shortly after, or simultaneously with the earliest infection. This manifests itself by a vascularization which in its earliest stage can only be detected by biomicroscopical methods. Such increased vascularity will militate against the development of corneal ulceration when, by chance or by accident, some of the superficial cells of the cornea are rubbed off. (Report of the Ophthalmic Section, Department of Public Health, Cairo, 1919, p. 6.)

However, when trachoma has reached a florid stage of prominent gelatinous follicles (Stage Tr. II*a*), or of papillary hypertrophy (Stage Tr. II*b*) the purulent discharge caused by conjunctivitis-producing bacteria remains in the interstices between the follicles and papillae and exerts a deleterious influence on the subjacent cornea.

So it may be stated that uncomplicated trachoma of Stage Tr. I is not a cause of blindness, but that trachoma complicated by superadded bacterial infections is a cause of blindness, the corneal-disintegrating factor being mainly the bacterial infection.

Not infrequently trachomatous eyes are seen which have survived a long-continued inflammatory process caused by bacteria, but are practically blind due to dense pannus. It is not improbable that without the vascularization due to the trachoma such eyes would have been completely destroyed.

Means of ophthalmic relief in Palestine.—Palestine is richly provided with means for the amelioration of ocular disease as compared with other countries, though still insufficiently to cope with the vast amount which exists.

First and foremost is the Ophthalmic Hospital of St. John of Jerusalem which is maintained by the Grand Priory in the British

Realm of the Venerable Order of the Hospital of St. John of Jerusalem. This Order was founded in Jerusalem in 1099 as an Order of Hospitallers. It was converted into a Military Order, and on the loss of Jerusalem it migrated to Acre, and thence to Rhodes and Malta, where it formed one of the most important bulwarks against the naval power of the Moslems in the Mediterranean. The Knights were expelled by Napoleon in 1798. The present headquarters of the Order are in an ancient building in London.

The Warden of the Hospital in Jerusalem is Dr. Strathearn to whom a great part of the success of the Hospital is due, and from whose writings much of the present information is obtained.

The Scottish Hospital also does important work. The Government provides seven hospitals in various places and also a travelling unit.

Treatment has been adopted in many of the schools. A training school for girls of marriageable age is about to be established so that they may learn how to look after the health of a family.

The Hadassah Medical Organization was created by American women and maintains five hospitals with ophthalmic departments; it also carries on ophthalmic treatment in Jewish schools, and is making an effort to bring home to dwellers in distant country places the importance of ocular hygiene and treatment, by means of clinics.

In the ancient Hebrew books there are several mentions of blindness supervening on groups of men (Genesis XIX, 11; II Kings VI, 18; and in the New Testament, also (Acts of the Apostles IX, 8; also XIII, 11) as well as several well-known miraculous cures of blindness. It is, therefore, incorrect for Dr. Jassky of Tel-Aviv, Palestine, to suggest that there was not much eye disease in Palestine in ancient days. It is true that he mentions the word trachoma, but in the East uncomplicated trachoma is a mild disease, though fulminating blindness may occur when it is combined with acute bacterial, especially gonococcal, infection. No doubt Saul of Tarsus was only lightly infected just before he got to Damascus, so that some slight treatment exhibited by Ananias soon put him right.

It is quite possible that all the Prophets, and later the Martyrs, had trachoma. Just as practically all indigenous inhabitants of Palestine have it now. There is no doubt that trachoma was rife in Egypt during the period of the Israelitish bondage in that country. It is almost inconceivable that they should not have brought it away with them, as one of their less desirable forms of plunder. In ancient days Palestine was a well-wooded country, and therefore, the rainfall was abundant. Since there was no fuel except trees a grand deforestation resulted, with a consequent diminution of rainfall. With an insufficient water supply trachoma and acute ophthalmias ran rife.

Trans-Jordania

This mandated country is bounded on the west by Palestine, on the north by Syria, on the east by Iraq, and on the south by Hejaz and Nejd. The total population is about 300,000, of whom about half are nomadic.

In the schools 24·9 per cent. of the pupils are stated to be trachomatous. Ophthalmic treatment is carried out in the schools; in 1931 the attendances for school treatment were 263,580.

At the government hospitals in 1931 the number of cases treated was 7,877, and at other clinics 1,198.

Eye drops are supplied to the heads of the religious organizations (which are predominately Moslem) for distribution.

It is probable that trachoma is practically universal.

Imperial Crown Colonies and Protectorates

Name	Area in square miles	Population	Report on eye diseases
AFRICA			
Southern Rhodesia ...	149,000	900,000	No information
Northern Rhodesia ...	288,000	1,270,000	No trachoma noted
Gambia	4,000	210,000	No trachoma noted
Gold Coast	79,000	2,030,000	No trachoma noted
Sierra Leone	34,000	1,541,000	Much conjunctivitis
Nigeria and Cameroon	336,000	19,000,000	No report
Somaliland	68,000	300,000	Much conjunctivitis, some trachoma
Kenya	200,000	2,530,000	Trachoma increasing, see account given
Uganda	223,500	3,145,500	Trachoma common
Tanganyika	365,000	4,122,000	Trachoma present
Zanzibar	1,020	200,000	See account
Nyassaland	38,000	1,200,000	See account
Sudan	1,015,000	6,000,000	See account
Mauritius	720	384,000	No report
Seychelles	150	25,000	No conjunctivitis
St. Helena and Ascension Islands	85	3,950	No report

Kenya

It is reported that trachoma is spreading fast among the natives of the colony. Formerly it was rare or non-existent, but it has been brought into the country by new-comers—Indians and Arabs—and unfortunately is still being introduced.

According to the last General Report, that of 1932, the number

of cases of conjunctivitis treated was 8,540 (some of which were probably trachomatous) as well as 184 cases of trachoma.

The equator bisects the country, which occupies a very elevated plateau.

Uganda

There were 26,980 cases of conjunctivitis and trachoma treated at the eye clinic at Mulago.

Tanganyika

In 1931, 735 cases of trachoma were treated in hospitals and 106 cases in dispensaries.

Although 8,713 cases of gonorrhoea were treated there were no cases of gonorrhoeal ophthalmia.

Zanzibar

External eye diseases are very common. From 2 to 4 per cent. of the pupils in the schools are more or less incapacitated by some form of conjunctivitis.

There are European, Asiatic and Native hospitals. There has been a special eye clinic established recently.

Nyassaland

There is a Native hospital and rural dispensary in each district. According to the last report, 19,316 cases of conjunctivitis were treated, and 22 cases of trachoma. It is probable that many of the cases conservatively diagnosed as conjunctivitis were really trachoma.

Sudan

The examination of 2,197 pupils in Government Schools at Khartum and other places showed that 972 were trachomatous. This information appeared in the last Government Report on the Public Health of the Sudan.

This finally disposes of the suggestion that trachoma is practically unknown in the Sudan. When I was in Egypt the belief was current that there was very little, if any, trachoma south of Asswan, but during a visit I paid to Nubia I found that all the pupils in a school on the side of the Nile opposite to Abu-Simbel were trachomatous; this is not very far north of Wadi Halfa.

The district of Nubia is where practically all the excellent servants and cooks employed in Egypt come from. As they are all trachomatous it is important that they should not be allowed to come into intimate contact with uninfected European children.

In all schools in the Sudan, which begins about 200 miles south of Asswan, along the banks of the Nile, arrangements for the treatment of trachoma have been instituted; in the majority of cases the masters have been trained to apply simple remedies under the supervision of the Medical Officers of Health and of the Eye Specialist.

On a report that a number of cases of blindness had occurred among certain tribes of the Bahr-el-Ghazal, about 1,000 miles or 1,600 kilometres south of Asswan, a British Medical Officer was sent to investigate. He found that there were actually 47 such cases and reported as follows:—

"The disease appears to be a gross form of choroido-retinitis, the onset of which is characterized by lacrimation and swelling of the lids, followed by night-blindness and progressing to complete blindness in from five months to two years. The choroido-retinitis is followed by optic atrophy and in many cases the disease is associated with a generalized uveitis with exudate and synechiae, and also cataractous changes in the lenses.

In a boy, aged 12 years, there was no trachoma, there was an eosinophilia of 10 per cent. (probably the result of intestinal parasites), lenses clear, disseminated retino-choroiditis, some pallor of the optic discs, no irido-cyclitis.

There is usually a strong family history of blindness. It has been suggested that the ocular condition is the result of eating fish, which are obtained by poisoning the water in which they live with a peculiar seed from a tall leguminous plant, the seed being of the appearance of a lentil and of a blackish-green colour. The leaves of the plant are rather fleshy with the under surface covered with silvery hair."

Imperial Crown Colonies

Name	Area in square miles	Population	Report on eye diseases
AMERICA			
Jamaica	4.200	863,000	
Bahamas	4,400	60,000	
Leeward Islands ...	750	140,000	
Windward Islands ...		162,000	
Barbados...	170	156,000	No trachoma noted in Government Health Reports
Trinidad and Tobago ...	1,860	366,000	
British Guiana	90,000	301,000	
British Honduras ...	8,600	46,000	
Bermuda	20	24,000	
Falkland Islands ...	4,618	3,000	

British Guiana

Although no trachoma is reported there is a considerable frequency of hypopyon ulcer.

Keratomalacia is frequent, due to defective diet. Night-blindness is not uncommon.

Toxic amblyopias are common during parturition and may result in optic atrophy.

Name	Area in square miles	Population	Report on eye diseases
OCEANIA			
Fiji Islands	7,500	157,000	Trachoma prevalent
Pacific Islands	12,500	200,000	Trachoma present

Fiji Islands

I have been in communication with one of the Government Medical Officers in Fiji with reference to the nature of a form of conjunctivitis prevalent in the Islands.

It is suggested in the last Colonial Office Report that this is not really trachoma, but "chronic granular follicular conjunctivitis." There is, of course, no such disease apart from trachoma. I have little doubt that the condition is trachoma. It is said to be rare to find a blind Fijian. As trachoma is not in itself a common cause of blindness, but only by its complications or sequelae there is nothing surprising in this.

There are 15 hospitals in various islands where eye treatment, of a kind, can be obtained.

Trachoma is a notifiable disease in the Islands.

At the welfare centres "Argyrol" is used for the treatment of conjunctivitis among children. This may account for the lack of success in treatment.

British Solomon Islands Protectorate

Eight cases of trachoma were treated in the hospitals as in-patients. This looks as if trachoma were definitely prevalent.

Summary

In the foregoing paper an account has been given of the incidence of trachoma and acute conjunctivitis in the various parts of the British Empire.

One or two points stand out as important. First in some of the distant possessions the claims of lethal diseases, such as plague, cholera, malaria and the anaemia of ankylostomiasis engage the whole attention and financial resources of the Public Health Administrations. Second a specialist knowledge of eye diseases cannot be expected of the ordinary competent Colonial Medical Officer, so that in some places the incidence of trachoma is grossly underestimated or indeed neglected.

In the absence of fulminating epidemics of acute conjunctivitis superadded to trachomatous conjunctivitis a population may be universally infected with trachoma without any insistent demand for treatment or prophylaxis. For instance, in some parts of India trachoma runs an uncomplicated course the affection being accepted as an ordinary or natural occurrence, while in Palestine hideous epidemics more than decimate the eyes of the natives.

No universal scheme of prophylaxis for all countries can be recommended. Each country may require a different method. But at least it can be said that the one method which can and should be applied to all countries is treatment in the schools. Even here great personal influence and tact may be required to bring into being a useful scheme of treatment. When I first attempted to introduce school treatment in Egypt I was met with decided opposition, both by the school-masters and the parents. Other official distrust, both administrative and medical, had to be overcome. Now all the Government Schools in Egypt have a most rigorous system of treatment carried out with the full support of both masters and parents.

I think that before any school treatment can be successfully attempted it is important to have in being a hospital or clinic where parents and relations can themselves experience the benefit of treatment.

While a rigorous school treatment by a specialist is desirable, a valuable, though second-rate, effect can be produced by the instillation of drops by the school-master or his deputy, always provided that this can be insisted upon, and not merely be a neglected order.

While the diagnosis of doubtful cases of trachoma may embarrass even the super-specialist, the recognition of the ordinary cases is not a difficult matter. However, to appreciate the life-history of the disease it is, in my opinion, essential to recognize its four phases or stages, the first stage of initial trachoma with tiny pinshead follicles (Tr. I), the second stage of gelatinous follicles or papillary development (Tr. II), the third stage of commencing cicatrization (Tr. III), and the fourth stage of cicatrized trachoma (Tr. IV).

The first two stages are those from which contagion commonly

occurs; the third stage is much less infective; while the fourth stage is non-infective.

Deterioration of visual acuity in cases of uncomplicated trachoma may result from trachomatous infiltration of the cornea manifested by vascularization or pannus, or by the friction produced by trichiasis-entropion causing corneal ulceration.

Blindness is a common sequela of trachoma which is complicated by acute bacterial conjunctivitis. This is especially frequent in Palestine. Severe ulceration of the cornea occurs in a high proportion of cases, and often leads to shrinking of the eyeball.

As I have shown elsewhere, a census of trachoma, expressed as a percentage of the population may be very misleading (*Brit. Jl. of Ophthal.*, July, 1931, p. 378 *et seq.*). Early stages of trachoma can be recognized in some cases only by observation of trachomatous infiltration of the cornea by means of the slit-lamp. Such a means of diagnosis is obviously impossible when a large number of suspected cases have to be examined.

The cure of trachoma occurs by the laying down of cicatricial tissue in place of the trachomatous granulation tissue. This may occur spontaneously, or as the result of the daily application of caustics over a prolonged period. Our means of induction of cicatricial tissue is no better now than it was 30 years ago.

The interest taken in the disease by ophthalmic surgeons who practise in trachomatous countries has been greatly stimulated by the publication of the "Revue Internationale du Trachome" by "La Ligue contre le Trachome" of which Morax is the mainspring, and by the Amsterdam offspring of the International Congress of Ophthalmology, "The International Organization against Trachoma." The twin sister of the latter society, the "International Association for the Prevention of Blindness," has a great part to perform in teaching the laity the principles of prophylaxis not only of disease, but of the accidents in factories.

My grateful acknowledgements for valuable information are due to the High Commissioners of Canada, Australia, New Zealand and the Union of South Africa; also to the Chief Medical Adviser of the Colonial Office and the Director-General of the Indian Medical Service. At the library of the London School of Tropical Medicine I received essential assistance.

ADULT FILARIA (WUCHERERIA) BANCROFTI IN THE ANTERIOR CHAMBER

BY

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IN the *Brit. Jl. of Ophthal.* for September, 1932, my colleague, Dr. K. Koman Nayar, published a record of the removal of an adult filarial worm from the eye of a patient from the west coast of India. Unfortunately the specimen was lost at the time of operation and neither its sex nor identity could be verified. Although it was surmised at the time that the worm was filaria bancrofti there is now room for doubt in view of recent work on filariasis in Travancore. Dr. Jacocks of the Rockefeller Foundation and his assistants, and Mr. M. O. T. Iyengar, Government Entomologist, Travancore, have shown that in the urban area of Trivandrum filaria (W) bancrofti is the responsible agent; Iyengar, working in two rural coastal areas of North Travancore, found that another type of infection is prevalent in these areas due to filaria malayi, a new species first described by Brug in 1927. In 1914 Cruickshank and the present writer working in British Cochin, a coastal area not far north of the above mentioned coastal localities, concluded that we were dealing with only one type of filarial infection, namely, that due to filaria (W) bancrofti. At that time a case had not been made out for the existence of filaria malayi. Although it now appears possible that we were dealing with two infections simultaneously occurring in the same place, neither the morphological minutiae of our microfilariae, nor the details of our feeding experiments afford enough evidence to determine this point. The adult filaria malayi has never been found and the existence of the species depends on morphological differences in the microfilariae, feeding experiments with different species of transmitting mosquitoes, and on the examination of the prevalent mosquitoes collected under natural conditions in the endemic areas, with regard to the development of the larval filariae within them. It is generally accepted that culex fatigans is the carrier of filaria (W) bancrofti in India and it appears from Iyengar's work that Mansonia (Mansonoides) annuliferus (Theob) is the transmitter of filaria malayi on the west coast. Although our mosquito survey showed the presence of Mansonoides septemguttata we did not attempt feeding experiments with this species, nor did we dissect specimens which might have been naturally infected. The

abnormal development of the larval forms in some of the culex fatigans fed on patients harbouring microfilariae supposed by us to have been bancrofti, is suggestive of the possibility that these patients had filaria malayi in their blood. Be this as it may, the bulk of the filariasis in Cochin is probably due to filaria (W) bancrofti. It has recently been suggested, however, that some of the adult worms which we obtained from patients in Cochin may be filaria malayi. In all, we recovered five complete worms and portions of at least six others from two patients, and stated that these "if not bancrofti at least very closely resembled this species." We described them in detail as they appeared "to differ in minor points from the descriptions at our disposal." Unfortunately this collection of worms is no longer available for further reference as the portions of it which we presented to various laboratories have been lost, but the detailed morphological points and measurements are given in the original communication, and all the original drawings are still preserved.

A comparison of the various features described by us show such slight variations from more recent descriptions by Mapleston (1929) of adult worms accepted as filaria (W) bancrofti, that until known adult specimens of filaria malayi are obtained and found to show only such slight variations from previously described types, our Cochin worms must be regarded as bancrofti. This view would also be supported by fresh finds of adult filarial worms collected in areas where the carrier of filaria malayi does not exist, in which trivial variations from type (such as in the number of the anal papillae, etc.,) were present. The entomological interest with which the present specimen may be regarded is obvious. It is an adult male filarial worm obtained from a patient who had never been outside an area in which Mansonoides is absent, but in which culex fatigans is common. Unfortunately microfilariae were not present in his blood, but they may yet appear and he will be examined from time to time with a view to finding them. This worm has not yet been worked out, but in due course a detailed description will be sent to the *Indian Journal of Medical Research*. Meantime it may be assumed to be filaria (W) bancrofti.

The clinical notes are as follows:—

A. P., male, Hindu, age 25 years, residing in Madras (George Town), was admitted on February 21, 1934, for iritis, right eye. There was a fine exudate on the pupillary border and flocculent deposit at the bottom of the anterior chamber with fine K.P. He was put on sodii salicyl. and atropine ointment; the usual blood tests, etc., were ordered. Right eye vision=6/18; left eye vision=6/6.

There were fine vitreous opacities, the disc was dull red indistinctly seen through the haze, details of the retina not clear. There

were two definite rounded haemorrhages each about 1/4 disc diameter just beyond the macular area, one superior temporal the other interior temporal in direction.

On March 5, 1934, in a routine examination a filarial worm was seen moving rapidly in the anterior chamber. The worm was easily visible to the naked eye because of its movements and a fluorescent sheen which gave rise to scintillations as it rapidly lashed and wound round itself in a loose tangle of coils. By the time the worm had been discovered it was no longer possible to get a sharp view of the fundus. With the corneal microscope fluorescence of the worm was very obvious at certain angles, although it was translucent or faintly opaque in other positions. Little could be made out even when the movements slowed down—as they did periodically—except that the tail was carried in the position characteristic of the male bancrofti; a sharp complete loop being maintained just in front of the anus. There were punctate brownish deposits all over the endothelium and fine dust-like floaters in the aqueous.

The patient did not give a history of filarial fever, did not show any filarial swellings, nor were microfilariae present in his night blood. As indicated in the entomological note above, the case was much more than an ophthalmological curiosity, but it presented another even greater interest. Filariasis is one of the great economic health problems of India. Up to the present there have been no practical proposals for its prevention or cure. In this patient I saw an opportunity to try the effect of drugs on an adult worm which could be kept under observation in natural conditions. The difficulty was to decide what drugs to try. Almost every drug which might have an influence on the nemathelminthes has at one time or another been tried in filariasis without effect. Ordinarily there is no way of checking the result on the adult except by noting the cessation of attacks of filarial fever, a sudden disappearance of microfilariae from the blood, or a cessation of elephantoid and glandular swellings and the possible subsidence of swellings already existing. I decided to try menthol for reasons which need not be given here, but was unable to find any record in standard works as to the maximum dosage. Dr. J. C. David, Professor of Pharmacology, Medical College, Madras, kindly undertook to work out the dose for dogs; meantime the patient was given one grain intramuscularly. Next morning the worm was not to be seen, but it reappeared in full vigour from the posterior segment after some hours. As the intra-ocular exudates were rapidly increasing it seemed unjustifiable to postpone operation, and it was decided to remove the worm, keep it alive if possible, and try the effect of drugs outside the body. (We eventually heard that dogs were unaffected by five grains of menthol intravenously.)

On March 8, 1934, the removal was undertaken. Dr. Koman

Nayar, who assisted me, described the difficulties he experienced in his case; when the anterior chamber was opened it simply disappeared, and so elaborate precautions were taken to avoid a repitition of this misfortune. A black mask was cramped on to the lid margins by means of the speculum. A black papier mâché dish full of warm saline was kept ready, and suitable pipette apparatus with which to receive it as it made exit. Pantocaine in small amount was used lest the usual cocainization should paralyse or kill the worm and prevent our taking it alive. A small keratome incision was made in the cornea, not more than 2 mm. in length on the deep aspect. The instrument was quickly withdrawn without the loss of more than a trace of aqueous. In the fraction of a second which this withdrawal took the worm disappeared, and neither operator, assistant, nor any of the numerous doctors present around the table could say where it had gone; all thought that it came out, but the most painstaking search did not reveal its whereabouts. With feelings of great disappointment the various paraphernalia were collected and placed in the dish of warm saline and sent to the laboratory whither I followed in about half an hour, not very hopefully, to renew the search. The various articles in the tray were systematically examined under the binocular dissecting microscope with powerful illumination and just as I was about to relinquish the search, I found the worm in a fold on the black mask. In spite of its length—about an inch—it could hardly have been discovered with the naked eye; every hair and stray piece of cotton fibre in the tray demanded scrutiny.

This somewhat lengthy description is given to emphasize the difficulties attendant on retrieving such a specimen for the benefit of others who may come across a filarial worm in the anterior chamber. It seems unlikely that the worm was merely washed out with escaping aqueous—the escape was too minute—but rather, that finding itself near an aperture where momentarily there was a forward movement of fluid, it exercised its instinctive urge to push on. When found it was alive, but sluggish; nearly two hours had elapsed since it left the eye. It was immediately placed in a watch glass of warm saline to which some fresh human serum was added and shortly afterwards transferred to a large volume of warm Locke's saline solution at 37°C. in the incubator. No further opportunity of trying the effect of drugs on its vitality was forthcoming as next morning it was dead. Presumably physical factors peculiar to the body fluids under natural conditions were essential to its existence; even a tissue fluid substitute at body temperature outside the body was insufficient for its vitality. The specimen was stored in 70 per cent. alcohol with 5 per cent. glycerine for further examination in due course.

The patient was discharged on April 23, 1934. At this time

right eye vision=6/6, left eye vision=6/6. There were fine dust-like vitreous opacities in the right eye. The disc presented the appearance of a subsiding neuritis with commencing atrophy, the arteries were narrow and thread-like, the peripapillary retina a dull grey. The haemorrhages had disappeared.

REFERENCES

Cruickshank and Wright.—Filariasis in Cochin. *Ind. Jl. of Med. Res.*, Vol. I, No. 4, 1914.

Brug.—Filaria Malayi N. Sp. Parasitic in Man in the Malay Archipelago. *Trans. Far. E. Cong. Trop. Med.*, Vol. III, 1927.

Mapleston.—A re-description of Wuchereria Bancrofti (Cobbold, 1877) with special reference to the tail in the male. *Ind. Jl. Med. Res.*, Vol. XVI, p. 683, 1929.

Iyengar.—Filariasis in North Travancore. *Ind. Jl. Med. Res.*, Vol. XX, October, 1932.

——— Filariasis in Trivandrum. *Ind. Jl. Med. Res.*, Vol. XX, April, 1933.

CATHOLYSIS AS A NEW TECHNIQUE FOR OPERATIVE CLOSURE OF HOLES IN THE RETINA AND FOR TREATMENT OF ITS DETACHMENT

BY

A. VOGT

ZÜRICH

AT the meeting of the Swiss Ophthalmological Society, May 4, 1934, Vogt reported for the first time on his new method of "catholysis." The apparatus generally used for electrolysis of the lashes can be employed. The anode is placed on the surface of the eye. The cathode is a very fine needle. After removal of the conjunctiva the spot is marked on the sclera with Indian ink. The needle cathode is passed through the sclera, deep enough to reach the detached retina. The application is very short. Galvanic current of 0·5 to 1 milliampères is used. The hole and its boundaries must be touched.

The method shows the following advantages in comparison with the galvano-cautery, the benzene-cautery and the caustic potash:—

1. Catholysis does the least damage. Cauterization produces temperatures of 500°C. to 1,000°C., caustic potash destroys the tissue to an uncontrollable extent; diathermy with 50 to 100 milliampères causes burns. The diathermic needle also pierces the detached retina in a dangerous and useless manner. The catholysis,

on the contrary, introduces only very small quantities of energy into the eye (0·5 to 1 milliampères). Thus the method is the most adequate to treat the delicate retina.

2. The other methods often produced scar membranes and secondary holes, opacities of the lens, optic neuritis. Late haemorrhages sometimes have occurred. These complications have never arisen after the new operation.

3. Only very small quantities of the vitreous are lost, even when the sclera is punctured frequently at one operation, which therefore need not be interrupted.

4. The needle can be passed into the eye as often as we want without danger, provided that only 0·5 to 1 milliampères are used and that the application lasts less than a second each time. Very large holes and multiple holes can, therefore, be treated in one operation. Exact dosage is possible.

5. The method was introduced by Vogt primarily because the cathode produces bubbles of hydrogen in the eye, at its point as well as along its whole length. These bubbles can easily be seen with the ophthalmoscope and allow determination of the topographical relations between the hole and the first puncture during the operation. We are able to make a preliminary puncture for orientation, and after ohpthalmoscopic control and correction of the puncture position on the sclera, to close the hole with a series of 5 to 20 or more punctures.

6. The method is very simple, harmless and painless. The scars are much more delicate than those following other methods. The operation can be finished in 5 to 10 minutes provided that the eye is prepared the day before and that care is taken to have a perfectly transparent cornea before and during the operation.

7. The results of the new method have been, up to the present, excellent. It was successful in cases of very old detachment, of very large holes and even in aged patients.

It must not be forgotten to put the anode on the bulb before the cathode pierces the sclera.

In 1893 Schoeler and Abadie tried electrolysis in cases of detachment apparently without permanent success, because they did not "aim" at the hole. Also the dosage was unsuitable. Nevertheless, recognition must be accorded to them for the introduction of electrolysis in the treatment of detachment. In 1894 Schoeler and Albran reported the results of histological investigations and demonstrated the delicacy of scarring. However, they, as well as Abadie, used the anode. von Szily and Machemer tried superficial electrolysis; they described the results of perforating electrolysis with the anode on healthy mammalian eyes and on a human eye without detachment. The use of the cathode was introduced by Vogt.

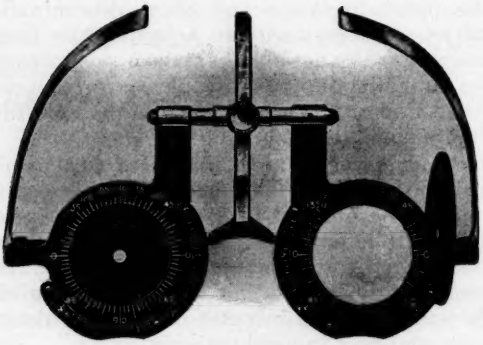
HINGED PERFORATED DIAPHRAGMS FOR THE TRIAL FRAME

BY

PERCIVAL J. HAY

SHEFFIELD

OPAQUE disks with a central perforation are in common use for reducing the dilated pupil artificially to the normal size when testing a patient's vision under a mydriatic. The advantages attached to these disks are well known. They reduce spherical and chromatic aberration and sharpen up the image by preventing glare. In practice they are often difficult to use, in that with some trial frames they hide the axis markings when placed in the front



Block lent by Theodore Hamblin, Ltd.

cells, and if inserted in the back cell they often do not allow a lens of even medium power to be inserted in the same cell.

Messrs. Theodore Hamblin have made for me perforated diaphragms which are hinged to the back of the trial frame, where they not only give the advantages already mentioned, but prevent reflections of the retinoscopy lamp from the back surface of the trial lens, and further make it easy to drop the lenses into the back cell without danger of their dropping to the floor. I have used the device for some time and find it extremely useful. It is necessary, of course, to determine the P. D. for each eye beforehand.

ABSTRACTS

I.—CORNEA

(1) **Aliquo-Mazzei. (Siena).—Band-shaped opacity of the cornea. (Contributo clinico-anatomo-patologico allo studio dell' opacità a cintura della cornea).** *Boll. d'Ocul.*, February, 1934.

(1) **Mazzei** has followed the course of this affection in a patient for some years. The beginning of the trouble was a corneal ulcer from an injury during the war. Since that time the vision of that eye had gradually failed; there had been a constant sensation of pricking. When first examined the cornea was completely anaesthetic; a band of opacity ran across the cornea having a breadth of about 2 mm. The surface seemed slightly raised and xerotic. The details of the fundus could not be seen because of organized exudate on the capsule of the lens. The opacity increased slowly in size and in January, 1933, covered almost all the area uncovered by the lids. A small piece of affected area of the cornea was excised for pathological examination. The epithelium was found to be thickened, the anterior layers corneified. There were granular deposits in Bowman's membrane, which was degenerated. There were no calcareous salts found; from this the author concludes that their deposition is secondary to the other changes (an opinion held for long in England).

HAROLD GRIMSDALE.

(2) **Galante. (Palermo).—The influence of the anterior and posterior epithelia of the cornea on its metabolism. (Azione degli strati epiteliali anteriore e posteriore della cornea sul'decorso dell'autolisi del tessuto proprio corneale).** *Boll. d'Ocul.*, February, 1934.

(2) The aim of these experiments was to find out what influence, if any, the epithelia had on the nutrition of the cornea. **Galante** took the two corneae of the same animal, and having removed the superficial epithelium and Bowman's membrane from one, weighed them accurately, cut them into small pieces and placed each cornea thus divided in a vessel containing physiological solution and sodium fluoride. The tubes were left for eight days in a thermostat at 38°.

At the end of this time he measured the quantity of amino-acids and found that the cornea deprived of epithelium had given rise to much less than the whole cornea.

On the other hand when the posterior epithelium was removed

in similar experiments, the quantity was greater in the case of the incomplete cornea. The actions of the two epithelia appear to neutralize each other.

HAROLD GRIMSDALE.

(3) **Kreiker, A. (Debrecen).—Complete covering of the cornea as a method of treating rodent ulcer. (Vollständige Bindehautdeckung der Hornhaut als Heilmittel des Ulcus corneae rodens).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XC, p. 361, 1933.

(3) **Kreiker** stresses that mere pulling the conjunctiva over the ulcerated surface does not give good results. There must be complete covering. When the condition is healed, and in any case, not longer than six months, a hole is made in the conjunctiva over the pupil. The rest of the conjunctiva gradually recedes. Two cases are reported in support of this treatment.

ARNOLD SORSBY.

II.—ANTERIOR CHAMBER AND FILTRATION ANGLE

(1) **Bracci-Torsi. (Pisa).—The immunising power of the aqueous and its various proteins, in normal conditions. (Sulle reazioni immunitarie dell'umore acqueo e sue frazioni proteiche in condizioni normali dell'occhio).** *Ann. di Ottal.*, May, 1934.

(1) The recognition of " anti-bodies " in the aqueous is difficult because of the small protein content of the normal fluid. When the aqueous is withdrawn, the fluid that replaces it is much more rich in proteins, and in this, the second aqueous, the recognition is more readily accomplished.

Bracci-Torsi has endeavoured to find to which of the various proteid bodies the anti-bodies were attached; to this end he has precipitated the various proteins by ammonium sulphate in varying strength, and has examined the several precipitates for the anti-bodies. He finds that the chief vectors in the aqueous, as in serum, are the euglobulin and the pseudo-globulin, the serum albumen has no union with the anti-bodies.

HAROLD GRIMSDALE.

(2) **Rehsteiner, K. (St. Gallen).—Cholesterin in the anterior chamber. (Akute Cholesterin-ansammlung in der Vorderkammer).** *Klin. Monatsbl. f. Augenheilk.*, Vol. LXXXIX, p. 291, 1932.

(2) The case reported by **Rehsteiner** has the distinguishing feature of the collection of crystals, examined clinically and

histologically, being free from any admixture of blood or exudate. There were no haemorrhages in the retina, and the possibility of the cholesterol coming from the intra-ocular circulation owing to changes in the permeability of the blood vessels is dismissed. The author draws attention to the findings by Schaaf in the cases of xanthoma of the skin; in this condition as in the case under consideration, blood cholesterol was diminished, whilst the lecithin content of the blood was increased.

ARNOLD SORSBY.

(3) **Trantas. (Athens). — Gonioscopy. (Sur la gonioscopie).** *Arch. di Ottal.*, January-February, 1934.

(3) By gonioscopy, **Trantas** means the examination of the angle of the anterior chamber, which may be brought into view by pressure on the sclera with a finger or a transilluminator or by means of a contact lens. Trantas makes pressure a few millimetres behind the limbus, either on the conjunctiva or through the lower lid. The observer uses either the naked eye or the corneal microscope. The author claims that by this observation he has proved the canal of Schlemm not to contain blood; and that in chronic glaucoma the angle may be seen in many cases to be open and not closed by adhesions.

HAROLD GRIMSDALE.

(4) **Nicolato. (Pavia).—Some details of the minute anatomy of the iridic angle in man. (Di alcune particolarita della fine anatomia dell'angolo irido-corneale nell'uomo).** *Rass. Ital. d'Oftal.*, May-June, 1933.

(4) **Nicolato** has examined the iridic angle in the eyes of foetuses of varying ages, in the infant and in the adult.

He finds that Descemet's membrane ends either by thinning out gradually or in a sharp chisel edge; that the trabeculae of the corneo-sclera have no direct connection with this end, which is interposed between the endothelium and the trabeculae. Where the trabeculae pass beyond the hyaloid layer they come under the endothelium which covers them.

He has not been able to find any connection between the elastic fibres and Descemet's membrane. The circular elastic fibres are separated from it by a layer of cement substance; the longitudinal elastic fibres pass beyond the end of Descemet's membrane to reach the point of union of the trabeculae with the parenchyma of the cornea. Developmentally, the trabeculae seem to be mesodermic and part of the uveal tract.

HAROLD GRIMSDALE.

III.—INJURIES

(1) **Hesky. (Trieste).—Aluminium foreign bodies in the eye. (Contributo clinico alle alterazioni derivanti all'occhio da scheggie d'aluminio endobulbari).** *Boll. d'Ocul.*, August, 1933.

(1) The results of the implantation of any foreign body in the eye depends greatly on the chemical reactions which it sets up, and the relative toxicity of the salts produced by these reactions. Some metals, such as gold, give rise to very little reaction; others, especially copper, are very badly tolerated. Aluminium has rarely been recorded in the eye as a foreign body, and in most cases, seems to remain unaltered for a long time. In **Hesky's** case the eye had remained quiet for some three years, but after that time became irritable and the vision failed to some extent. Two years later the patient sought advice. Then there was ciliary injection and a deep opacity in the lower half of the cornea. It was not possible to see the lower part of the iris and anterior chamber. There was no visible wound of the iris or damage to the lens; on account of the history the author suspected the presence of a foreign body and on examining the patient lying on the side, a loose, black body moved from behind the corneal opacity to the part of the anterior chamber then lowest. This was removed by operation, breaking up into tiny fragments in the act; it proved to be aluminium. The removal was followed by clearing of the cornea.

HAROLD GRIMSDALE.

(2) **Halász, C. (Budapest).—Migration and spontaneous extrusion of intra-ocular splinters of copper. (Ueber Wanderungen und Spontanausstossung intraokular Kupfersplitter).** *Zeitschr. f. Augenheilk.*, Vol. LXXIX, p. 33, 1932.

(2) **Halász** reports four cases in which copper splinters 1 to 2 mm. in size migrated from the deeper parts of the eye into the anterior chamber, becoming embedded in the limbus, so that they could be extracted with a pair of forceps. Migration began following a quiescent period after the injury 4 to 5 years in three cases, and 11 years in the fourth. The migration itself lasted from two weeks to 14 months. Only in one case was there evidence of chalcosis in the form of sunflower opacity of the lens, and in this case the injury was four years old.

ARNOLD SORSBY.

(3) **Jungraw, Izabella (Lwów).—Fatal case of endophthalmitis and purulent meningitis after knife injury of the cornea. (Ein tödlich verlaufender Fall von Endophthalmitis und Meningitis purulenta nach einer Messerverletzung der Hornhaut).** *Zeitschr. f. Augenheilk.*, Vol. LXXIX, p. 368, 1933.

(3) **Jungraw** reports the case of a boy, aged 12 years, who was seen three days after a perforating injury of the cornea; the wound was infected and traumatic cataract was present. The day after panophthalmitis had developed, and this was followed within a few days by signs of meningeal irritation. Lumbar puncture fluid showed the presence of staphylococcus brevis. Post-mortem examination revealed diffuse leptomeningitis, especially at the base; the infection had been spread from the eye along the lymph spaces of the optic nerve.

ARNOLD SORSBY.

(4) **Roese, H. F. (Greifswald).—Injury to orbital contents in endonasal operations on the ethmoid. (Ueber Verletzungen des Orbitalinhaltes bei endonasaler Siebbeinausräumung).** *Klin. Monatsbl. f. Augenheilk.*, Vol. XCI, p. 95, 1933.

(4) **Roese** reports two cases in which permanent injury was sustained as the result of ethmoid operations. In one case the eye on the operated side became much swollen, on subsidence the eye was found to be abducted. Advancement of the internal rectus was impossible as the muscle was surrounded by dense scar tissue; presumably the muscle had been torn off at its origin. In the second case, the lamina papyracea was perforated, optic nerve divided, oculo-motor nerve and also the first division of "V" injured. Clinically, there was: blindness, disturbed sensation of the forehead, palpebral narrowing, enophthalmos, complete palsy of III, dilated pupil and optic atrophy.

[The reviewer has experience of a case similar to the first noted above. Bilateral abduction with diplopia followed immediately after a bilateral intranasal operation on the ethmoid. Nine months later bilateral advancement of the internal rectus, on both sides reduced to a fibrous band, gave but little result.]

ARNOLD SORSBY.

(5) **Hoffmann, W. and Kunz, E. (Königsberg).—On heat injuries of the eye. (Ueber Wärmeschadigungen des Auges).** *Arch. f. Ophthal.*, Vol. CXXXII, p. 155.

(5) The object of this research by **Hoffmann and Kunz** was to study the acute changes induced by the action of hot water and diathermy on rabbits' eyes.

The character of these changes was, on the whole, independent of the manner in which the heat was applied, and their intensity corresponded to the height of the temperature. They began to appear when the temperature rose above 45°C.

In the lens, cataract developed through the breaking down of the fibres under the capsule, and extended towards the centre with further rise of the temperature.

By an alteration in the conditions of the experiments with diathermy the extent of the opacity could be restricted to portions of the lens surface. This " heat " cataract, however, showed both morphologically and genetically considerable differences from Vogt's " fire " cataract.

The changes in the other tissues of the eye were largely due to disturbances in the circulation, congestion of the blood vessels, exudation of highly albuminous lymph and haemorrhage, all of which could assume enormous dimensions. The epithelial structures suffered earlier and more severely than the connective tissues; the retina was particularly affected, more especially in the inner layers.

These results bear a close resemblance to those that have been obtained with infra-red rays.

THOS. SNOWBALL.

(6) **Schmelzer, H. (Erlangen).—Injury by mercury sublimate. (Sublimatverätzung des Auges).** ***Klin. Monatsbl. f. Augenheilk.***, Vol. XC, p. 185, 1933.

(6) **Schmelzer** reports a case of a severe injury of an only eye by the accidental insufflation of mercury sublimate. On the third day operation was undertaken, the cornea being covered by mucosa from the mouth by the method of Denig. The patient did well, the cornea remaining transparent. Sublimate insufflation in seven rabbits led to bad results and the author holds that in all probability the mucous transplant was responsible for the favourable course in his patient.

ARNOLD SORSBY.

(7) **D'Asaro Biondo (Turin).—Injuries to the eye from coal tar and its derivatives. (Lesioni dell'occhio da catrame di carbon fossile e suoi derivati).** ***Rass. Ital. di Ottal.***, March, 1933.

(7) Coal tar and its derivatives play an ever increasingly important rôle in modern commerce; **Biondo** has investigated the action of the several products on the eye. Practically all the substances of this group are irritating to the eye and some are

powerfully caustic. The hydrocarbons are the least and the phenol derivatives the most capable of causing severe damage. The paper gives the results of experiments with some 30 different bodies.

HAROLD GRIMSDALE.

IV.—REFRACTION AND OPTICS

(1) **Ferree, C. E. and Rand, G. (Baltimore).—Lamp for determination and measurement of the preferred intensity of light for reading and for other work.** *Arch. of Ophthal.*, July, 1934.

(1) **Ferree and Rand** point out in their paper the great importance of adequate lighting for reading and other forms of close work. An increase of intensity of light over a suitable range has two effects which facilitate reading. (1) The pupil contracts and thus increases the depth of focus of the eye; (2) the sensation difference between the object and its background is increased. In the aged, an increase in illumination is obviously of value because of diminished transparency of the media and of diminished sensitivity of the retina. The authors have devised a lamp which is of service in determining the optimum illumination for various purposes. Full details are given in the paper, and it consists of a powerful round bulb with a reflector behind it enclosed in a box of which one side is open. This side is fitted with four horizontal shutters and by opening or closing these the amount of light can be varied from 90 foot candles down to zero. Since no rheostat is used, there is no variation of colour on diminishing the illumination. The shutters are covered in front by a plate of " Belgian flashed opal glass " so as to eliminate shadows. The lamp has many uses, thus it can be employed for illuminating test types and tangent screens, and can also be employed for determining the optimum illumination for various industrial processes. It is a simple matter to substitute etched daylight glass for the opal glass and in this way, to determine the amount of light required in work which involves colour matching.

F. A. W-N.

(2) **Tron, Eugen (Leningrad).—On the optical bases of ametropia. (Ueber die optischen Grundlagen der Ametropia).** *Arch. f. Ophthal.*, Vol. CXXXII, p. 182.

(2) In this article on ametropia **Tron** points out that all the constituents of the dioptric apparatus of the eye—the refractive

power of the cornea, lens, and eye as a whole—show variations closely corresponding to the normal variation curve. The axial length in the large number of cases examined, however, was an exception, but its variation curve conformed to the binomial if the cases of myopia over -6·0 D. were excluded.

Emmetropia may result from a very variable combination of the optical elements of the eye. In a series of 60 emmetropic eyes the refractive power of the eye varied between 52·59 and 64·21 D., and the axial length between 22·42 and 27·30 mm. It is only by taking into account this variability in emmetropia that a correct conception of the character of the ametropia in individual cases can be obtained. Ametropia, therefore, may arise where either the axial length or refractive power (or both) is outside the limits of the values of these factors in emmetropia. It may also arise where these are both within the variation limits of emmetropia, but occur together in particular combination—combination ametropia—the importance of which the author repeatedly emphasizes. It was found to be much more common in his series of cases than the axial or refractive types.

The significance of the axial length in determining the refraction of the eye varies with different degrees of ametropia; among high ametropes axial ametropia predominates, while in the lower grades the combination ametropia is more frequent.

While combination and emmetropia agree in the variation limits of the refractive power of the eye and the axial length, they differ in respect to the distribution of these variants. Thus, in combination myopia the longer axial lengths occur most frequently, while in combination hypermetropia the shorter lengths are more common. Accordingly the averages for the axial length in combination hypermetropia, emmetropia and combination myopia are also different.

Axial ametropia forms a heterogeneous group; it includes cases with axial lengths that are only extreme variants of the normal variation curve, and eyes with pathologically shortened or increased axial lengths.

The spheres of combination ametropia and axial ametropia overlap fairly freely, so that different forms of ametropia with the same refractive error occur. The degree of refractive error, therefore, cannot be taken as a guide for differentiating the individual groups.

The sphere of school myopia gives an indication of the frequency of combination ametropia, and hence cannot be regarded as the result of a pathological lengthening of the axis produced by close work at school.

A study of some 20 cases of high myopia with reference to the presence of changes round the optic disc shows that there is no

direct relation between these changes and the axial lengths of these eyes, nor can they be cited as proof of the axial character of the myopia.

THOS. SNOWBALL.

(3) **Colombo. (Padua).—Behaviour of astigmatism in accommodation. (Comportamento dell'astigmatismo durante l'accomodazione).** *Ann. di Ottal.*, February, 1934.

(3) **Colombo** has examined the amount of astigmatism during rest and accommodation, of a number of eyes; with the object of discovering whether any alteration of astigmatism was possible by the effort of accommodation.

He finds that in the majority of cases the alteration is purely spherical; in a few cases, however, he observed an asymmetrical contraction, but never a diminution of the astigmatism.

HAROLD GRIMSDALE.

V.—MISCELLANEOUS

(1) **Corrado (Pisa).—The late results of treatment of pituitary tumours by X-rays. (Esiti lontani del trattamento Roentgenterapico del tumori sellari e parasellari).** *Ann. di Ottal.*, January and June, 1933.

(1) The first part of this contribution is chiefly historical, analysing the reports and opinions of other surgeons. **Corrado** quotes with approval the opinion expressed by Cavina in the paper just mentioned, that X-rays and radium are useful measures of treatment in properly selected cases, and with suitable application. It is probably due to the injudicious selection of cases, that the opinions of surgeons vary so greatly as to the value of this means of treatment.

As regards surgical interference, the relative success of the endocranial and trans-sphenoidal methods is still uncertain. In the hands of the most successful operators the risk is not very great; Cushing, operating by the transfrontal route, has had a mortality of 6 per cent.; Frazier 5 per cent. against a trans-sphenoidal rate of 3·4 per cent. A considerable proportion of those operated on successfully die later from recurrence of the tumour, but when the tumour is non-malignant, the results are extremely good. The vision, which is generally much reduced before operation, is, in most cases, recovered to a greater or less extent and the visual fields expand, so long as the fibres of the optic nerve are not completely degenerate.

In the second fascicle of the paper appearing in the June number, the author gives the details of some patients who have benefited from the use of ray treatment, with results which have remained good for some years. He reproduces radiograms taken at intervals of some of these patients, which show a tendency on the part of the sella to return towards normal.

The part of the paper dealing with the cases which do not improve under treatment has not yet appeared.

HAROLD GRIMSDALE.

(2) **Derby, George S. (Boston).—The need of medical social service in eye clinics.** *Jl. Amer. Med. Assoc.*, January 30, 1932.

(2) In this paper the late **G. S. Derby** pointed out the importance of medical social service in eye clinics. He showed that there is a great and useful field of work which lies beyond the consulting surgeon's activities of examination, diagnosis and advice about treatment.

Much of the latter's work is wasted by patients who do not or cannot devote time to the necessary treatment, who will not attend the hospital for "follow-up" supervision and are prevented by economic and industrial circumstances from receiving adequate and proper treatment.

Time spent in investigating the domestic and economic position of such patients, supervising treatment and affording facilities for attending hospital and "follow-up" work is well rewarded by the prevention of protracted disease and the conservation of useful vision in many cases. For this purpose medical social workers are of considerable value. The author stresses the importance of this work particularly in cases of glaucoma, trachoma, ophthalmia neonatorum, phlyctenular conjunctivitis, tuberculous lesions of the eye, cataract and myopia.

The author considered that any eye hospital or clinic is seriously hampered and much of its good work wasted by not having social service workers attached to its personnel.

H. B. STALLARD.

(3) **Guthrie, C. C. (Pittsburgh).—Physiologic lens-less spectacles.** *Arch. of Ophthal.*, February, 1934.

(3) **Guthrie's** work is an elaboration of the stenopaeic hole, well known to all ophthalmologists. This elaboration consists in having a disc with multiple holes instead of a single one. The smaller the holes, the sharper the definition, but the less the brightness, and there is a physiological optimum between the sharpness and brightness which varies according to conditions of illumination.

The size of the apertures should, therefore, be variable, and one method of securing this is to have two perforated discs, mounted one behind the other. On rotating one, the holes in the other will be partially or totally occluded. For practical purposes the range in size should extend from 1·5 mm. for far vision to 0·3 mm. for sharpest near vision. The spacing of the holes is also important, the ideal is very close to 4 mm. The following are some of the author's results. Eyes requiring 3-4 D. for correcting accommodation or so astigmatic that they cannot read 6/60 can see 30/20 with the discs and read J1. Atropized eyes can see sharply and without strain. Emmetropic vision is not improved except for gun sighting, glare, etc.

F. A. W-N.

(4) **Spaeth, Edmund B. (Philadelphia).—Clinical determination of the light threshold.** *Arch. of Ophthal.*, March, 1934.

(4) **Spaeth,** after a preliminary discussion of the difference between light sense and visual acuity, suggests the value of determining the former in different eye diseases. In testing the light sense there are various difficulties to be overcome if accurate results are to be obtained. These comprise (1) variation in size of the pupil; (2) varying sensitivity of different portions of the retina. No. 1 is overcome by "fixing the pupil" with a preliminary instillation of 0·5 per cent pilocarpine. No. 2 by illuminating an area of retina which subtends an angle of 36° on each side of the fixation point. The degree of dark adaptation is made as uniform as possible by using a standard time (20 minutes) for each patient and by insisting on a preliminary period of light adaptation, again under standardized conditions. The instrument used was a light-tight pair of goggles with an aperture in front of each eye for a prism of a special green glass.

Some of the author's findings were as follows:—All types of glaucoma showed a rise in the light threshold, most marked in the acute and subacute forms. It is probable that increase in the light minimum antedates all other signs and symptoms of glaucoma. All cases of retinal detachment showed a marked increase of the minimum light sense and a return of field and visual acuity after reposition of the retina did not result in a proportionate increase of light sense. Cases of retinitis pigmentosa showed marked lowering of light sense while in keratitis and cataract the light minimum was less impaired than the visual acuity. In tabetic optic atrophy the impairment in the light minimum was greater than the fall in visual acuity; in "secondary optic atrophy" the reverse occurred. In inflammatory conditions of the fundus, patients with a high degree of choroidal disease showed the greatest defect in light threshold; haemorrhagic changes

produced little deviation from the normal. In amblyopia ex anopsia, it was most uncommon to find the light minimum as low in proportion as the visual acuity. This is partly, but not wholly, to be accounted for by eccentric fixation. In albinism and various other congenital defects the increase in the light threshold was proportionate to the loss of visual acuity while in retrobulbar neuritis it was greater. The author's article closes with a short résumé of the findings of others on this subject.

F. A. W-N.

(5) **Dekking, H. M. (Nymegen, Holland).—Colour photography of the eye.** *Arch. of Ophthal.*, February, 1934.

(5) This article applies to colour photography of the anterior segment of the eye, and Dekking has worked out a simple technique which seems to give satisfactory results. The source of light is a Philips ciné-bulb of 15 volts, 50 ampères. It has a small spherical mirror in front which forms an image of the two filaments between the filaments themselves and has a glass parabolic mirror behind with a focal length of 3 inches and an aperture of 8 inches. The camera works with a stop of 10 and has a "finder camera" above it for focusing, the two forming a single unit with the source of light. The length of exposure is 0·08 second and the magnification obtained is three times. "Agfacolor" plates were found to give satisfactory results.

F. A. W-N.

BOOK NOTICES

Atlas Fundus Oculi. By WILLIAM HOLLAND WILMER, M.D., LL.D., Sc.D. Colour Plates, 100. London: Henry Kimpton. 1934. Price, £7 7s.

The author in his foreword to this work quotes a Chinese proverb "One picture imparts as much information as ten thousand words," and though this may be an exaggeration the 100 pictures in this volume certainly convey a great deal of information. They are beautifully reproduced in colour on a matt surfaced paper, and being 15 cm. in diameter, are sufficiently large to allow the beholder to see all the details. A short account of each case is printed on the page opposite the fundus drawing, giving the diagnosis, clinical and laboratory findings, visual fields, visual acuity and other details. These greatly enhance the value of the drawings, but the descriptions have purposely been kept short, though full details of each case are available at the Johns Hopkins Hospital.

The drawings are all the work of the same artist, Mrs. Burgess, who is to be congratulated on the skill with which she has completed her task. They were made with an electric ophthalmoscope using the direct method and their correctness verified by the use of the Gullstrand and Friedenwald instruments. The subjects consist of various types of normal fundi of white and coloured individuals, a few congenital anomalies and some of the more common fundus lesions. In addition there are fundus drawings of some of the animals commonly used for laboratory purposes (dog, cat, rabbit, guinea-pig, monkey).

The collection of drawings is a valuable one and should be especially useful for teaching purposes; for this reason, it will probably find a place in many reference libraries and in the private libraries of physicians and ophthalmic surgeons.

The justifications for the production of this volume are several. The author reminds us that the older atlases of Frost, Haab and others are becoming difficult to obtain, whereas the number of ophthalmic students is increasing and general medicine and ophthalmology are becoming more closely associated. Also, the older atlases, though excellent in many ways did not show the fine changes which are visible with the more modern type of ophthalmoscope and the accounts they give as to the cause of the lesions depicted are not always accepted nowadays. In this connection it is interesting to note that in the volume under review there are no fewer than 10 plates of choroido-retinitis in which the lesion is attributed to tuberculosis.

In addition to the coloured plates, this work contains an interesting introductory chapter by Dr. Warfield Longcope in which he emphasises the value of the ophthalmoscope to those engaged in general medicine. There is also a chapter by the author on ophthalmoscopic examination wherein he describes the technique to be followed and some of the pitfalls which await the inexperienced tyro. It is to help the student to avoid these that the first eight drawings are concerned with normal types of fundi and a further six, with congenital anomalies.

No expense or trouble would seem to have been spared in the preparation of Wilmer's Atlas of the Fundus Oculi, and it stands as a fitting monument to the fame and erudition of its author.

Report of the Committee of Inquiry into Problems Relating to Partially Sighted Children. Pp. 200. Printed and Published by His Majesty's Stationery Office. 1934. Price, 3s. net.

The problem of the partially sighted child is one which closely concerns ophthalmic surgeons, particularly those in charge of school clinics, and this report will be welcomed as a means of solving, at any rate, some of their difficulties.

The Committee who prepared the report were appointed in December, 1931, and during their deliberations examined 22 oral witnesses, and were assisted by the investigations and memoranda of 35 other witnesses, in addition to various authorities who helped by answering questionnaires or in other ways. Those whose opinions were taken included ophthalmic surgeons of wide experience, directors of education, school medical officers and head teachers of schools for the blind and partially sighted. The information was, therefore, obtained from a wide field and this is reflected in the broadminded, commonsense way in which the report is written. The committee is to be congratulated first on their avoidance of dogmatism where such would appear to be unwarranted, and secondly on their courage in not shirking issues and in giving opinions whenever possible. An example of this is to be found in the summary of their conclusions for the selection of myopes to special schools or classes for the partially sighted, in which the first paragraph states "No hard and fast rules can be laid down, but it is desirable to formulate certain general principles in order to reduce divergences in practice." This is the spirit in which the report is written. It is as though the authors were saying to themselves the whole time, "Although we have not yet reached finality, we have at any rate obtained some valuable information and this we propose to pass on to you." All sides of the question are considered; thus, the use of a typewriter would seem at first sight to be an admirable substitute for hand-writing, but the report reminds us that "in present social conditions there are not many children who will have access to typewriters after they leave school" and that the acquisition of any considerable skill in using one might be an inducement in later life to take up the occupation of shorthand typist. The question of the school-leaving age is tackled in the same broad-minded fashion. Theoretically, the longer these children stay under special supervision at school, the better for them, but against this is the unfortunate fact that "jobs are harder to obtain at 16 than at 14" so that if normal sighted children are allowed to leave school at the earlier age, the partially sighted child is still further handicapped by being left there another two years—"the partially sighted members of the community must play their part and take their chance in the ordinary workaday world."

It has already been intimated that this report is of great value to ophthalmic surgeons and the natural corollary that it should be read by them need hardly be emphasized. To the reviewer, however, it has an even wider significance because in its avoidance of fanaticism, its spirit of compromise and of making the best of things as they are, it stands as an example of a peculiarly British quality which is the envy of the rest of the world.

CORRESPONDENCE

OCULAR TORTICOLLIS

To the Editors of THE BRITISH JOURNAL OF OPHTHALMOLOGY.

SIR,—Mr. Temple-Smith, in a letter appearing in your September issue, criticises some of the statements in the brief abstract published in the *Brit. Jl. of Ophthal.* of a paper on ocular torticollis read by me at the last meeting of The Ophthalmological Society.

It is impossible adequately to discuss in a short letter many of the points he has raised, and most of them were dealt with at some length in my paper, which will be published in full in the forthcoming volume of the Transactions. To this I must refer Mr. Temple-Smith for further elucidation of my views on the subject.

Yours truly,

W. H. MCMULLEN.

LONDON,
September 27, 1934.

OBITUARY

W. C. POSEY

WE much regret to learn that Dr. Posey died suddenly at Naples on September 5, just as he had embarked on his homeward journey to the States.

William Campbell Posey was born in Philadelphia in 1868, the son of Dr. David Posey. Educated at the Episcopal Academy, he proceeded to the University of Pennsylvania and qualified in 1889. After the customary period as House Surgeon, he spent a couple of years in post-graduate study in Berlin, Göttingen, Paris and London, where he worked at Moorfields. Posey was connected with numerous hospitals, the chief of which was the Wills Hospital, where he was Assistant Surgeon from 1893 to 1902, and afterwards Surgeon. With Dr. S. H. Brown he was the author of the History of Wills Hospital and traced the growth

of ophthalmology in Philadelphia and in the States during the past 100 years. This work was reviewed in our columns in Vol. XVI, p. 115, by his intimate friend, Mr. Treacher Collins.

Posey and Spiller's "The Eye and the Nervous System" was published in 1906 and was at once recognized as a pioneer work in this subject, while his "Hygiene of the Eye," published in 1918, is a classic.

Posey was President of the American Ophthalmological Society in 1929; he was also a very active member of the National Society for the Prevention of Blindness, and became a member of its Board of Directors in 1922. Probably the last thing he wrote was the article published in the Sight-Saving Review this summer. The title is "The romance in the movement for the Prevention of Blindness," and in it he traces the history of the movement from the days when Benjamin Gibson of Manchester emphasized the connection, hinted at by Quellmaltz about half a century earlier, between 'babies' sore eyes' and vaginal discharge in the mother. Gibson's work was not recognized at the time, and so late as 1837 we find the Spanish Cortes decreeing that babies be baptized "with warm water, since the cold water commonly employed was so often followed by sore eyes and in many cases by blindness."

The work of Credé and of Ernst Fuchs, Lucien Howe, Park Lewis and the Misses Edith and Winifred Holt with that of Louisa Lee Schulyer is noticed.

We are indebted to Mr. Lewis Carris for sending us a clipping from the New York Times of September 6, and a reprint of Posey's last article.

Much sympathy will be felt for Dr. Posey's widow and children; his untimely death is a heavy blow to ophthalmology.

ARTHUR ZORAB

WE much regret to record the death of Mr. Zorab of Southampton, which occurred at the end of August, 1934. Mr. Zorab was born in 1880, the son of Col. Zorab, I.M.S.; he was educated at Guy's Hospital and took the conjoint diploma in 1906, graduating M.B., B.S. at the University of London in the same year. Settling at Southampton he rapidly made his mark as an ophthalmic surgeon. He was Hon. Surgeon to the Southampton Eye Hospital and Ophthalmic Surgeon to the Royal Hants. County Hospital at Winchester. Mr. Zorab was a member of the Ophthalmolgical Society of the United Kingdom and Oxford Congress, and had been chief assistant in the Ophthalmic Department at Guy's

Hospital, and at one time Lieut. I.M.S. He was the author of several papers in the Transactions, and in our columns; his most notable contribution being his work with Mayou on Aqueoplasty, published in 1912.

We understand that he was at work until the end in spite of indifferent health. Much sympathy will be felt for his widow and relatives.

NOTES

Royal Eye Hospital Scholarship

APPLICATIONS are invited for the research scholarship tenable at the Royal Eye Hospital, St. George's Circus, S.E.1, and are to be received by November 14. The value of the scholarship is £100 per annum.

* * * *

Hunterian Lecture

Mr. B. W. RYCROFT was elected a Hunterian Professor at the Royal College of Surgeons in July, 1934. His lecture will be delivered on January 28, 1935, at 5 p.m. The title is "Recent Investigations in the Aetiology and Treatment of Glaucoma."

* * * *

National Society for the Prevention of Blindness, Inc.

Mr. M. H. BIGELOW and Mr. J. C. CLARK, of New York City, have joined the Executive Committee of the Society, Mr. Clark having been chosen Treasurer. Dr. Edward Jackson has become a Director of the Society and Dr. P. W. Cobb a member of the Editorial Committee of the "Sight-Saving Review."

FUTURE ARRANGEMENTS

1934

November 9.—Section of Ophthalmology, Royal Society of Medicine.

November 16.—North of England Ophthalmological Society, at Bradford.

December 7.—North of England Ophthalmological Society, at Leeds.

December 14.—Section of Ophthalmology, Royal Society of Medicine (Clinical Meeting).

1935

January 11.—Section of Ophthalmology, Royal Society of Medicine.

February 8.—Section of Ophthalmology, Royal Society of Medicine.

February 15.—North of England Ophthalmological Society, at Newcastle-on-Tyne.

March 8.—Section of Ophthalmology, Royal Society of Medicine (Clinical Meeting).

March 15.—North of England Ophthalmological Society, at Liverpool.

April 12.—North of England Ophthalmological Society, at Sheffield.

June 14.—Section of Ophthalmology, Royal Society of Medicine (Annual Meeting).

CONTEMPORARY OPHTHALMIC LITERATURE

American Journal of Ophthalmology. *September, 1934.*

THYGESON. Biomicroscopy of the limbus corneae in trachoma and other conjunctival diseases.
DE LONG. Primary tumours of the optic nerve.
PASCAL. Visual and orthoptic training.
GUNDERSON. Subconjunctival iron deposits after adrenin injections.
SALIT. Chlorine content of aqueous, vitreous and serum.
GOWEN. Newer knowledge of bacteriology applied to ophthalmology.
BERENS, KERN and PAYNE. A tangent screen with artificial daylight illumination.
GUIBOR. The possibilities of orthoptic training.
EVANS. Studies on the crystalline lens.

Archives d'Ophtalmologie. *September, 1934.*

FLEDELIUS. Hemianopia of traumatic origin.
MORARD. The reticulo-endothelial system of the eye.
GRINBARG and BLIDSTEIN-NEVOROCHKINKA. The action of ultra-violet rays on follicular affections of the palpebral conjunctiva of the dog.

Revue Internationale du Trachome. *January, 1934.*

MACCALLAN. The clinical signs of trachoma.
MORAX. The trachoma campaign in North Africa.
TALBOT. Trachoma and blindness in Southern Tunisia.
SCHOUSBOE. The epidemiology of infantile trachoma illustrated by graphs.

TRAPEZONTZEWA and NIKOLSRAJA. Bactericidal properties of Chaulmoogra oil.
MACCALLAN. Pterygium and trachoma.
BARGY. Pterygium and trachoma.

April, 1934.

MOTAIS. Tarsectomy via the skin.
SELFA. Copper citrate in trachoma.
FALTA. Unity in trachoma.
POLEFF. The trachoma campaign with a mixed population.
PUSCARIU. Unilateral trachoma. Unilateral gonococcal conjunctivitis.
ROSTKOWSKI. Lid everter in treatment of trachoma.
VALLARINO. Trachoma in Huelva.

Annali di Ottalmologia e Clinica Oculistica. *August, 1934.*

RINALDI. Modifying influence of the activity of the sexual glands on septic wounds of the cornea.
RUSSO. Genito-sclerodermic syndrome and cataract.
BIFFIS. Topographical research on retinal sensibility through the photomotor reflex of the pupils.
ZANETTIN. Focal infections and ocular diseases.

September, 1934.

CORRADO. On the pathogenesis of calcareous concretions of the papilla in relation to the processes of calcification.
RINALDI. Experimental research on the ocular complications of spirochaetal haemorrhagic icterus.
GIANNINI. Clinical contribution to the study of "Punctate albino fundus."
VILLANI. Histological study of the lesions of the epithelial pigment of the iris and of the epithelium of the ciliary body in experimental diabetes.
L'ELTORE. Considerations on conglomerate tuberculosis of the uveal tract.
ZANETTIN. Focal infections and eye diseases.

Archivio di Ottalmologia. *April-May, 1934.*

CORDERO and PORTA. Contribution to the study of the relation between glaucoma and deafness.
ROSSI. Parathyroid and ocular tension.
MAZZI. On the passage in the eye of alcohol injected intravenously.
——— Familial maculo-retinal degeneration associated with retinal haemorrhage.

Lettura Oftalmologica. *June, 1934.*

MOSSA. Free cysts, moving in the anterior chamber.
PADOVANI. A personal method of anti-trachoma therapy with intra-muscular injection of colloidal copper.
MOSSA. Influence of the extraction of lacrymal glands on the intra-ocular tension.

Rassegna Italiana d'Ottalmologia. *May-June, 1934.*

CATTANEO. Hyperplastic form of trachomatous conjunctiva.
FAVALORO. Further research on contagiousness, immunity, and re-infection in trachoma.
GALANTE. Clinical research on light sense. The light sense in tuberculous persons and diabetics.

PAPGNO. A new method of fixing the ocular globe with a "blepharo-ophthalmostato."
BUSACCO. On the traumatic syndrome of the orbital apex.
CORRADO. A case of posterior ethmoiditis with orbital complications and a cutaneous fistula.
ANGIUS. Research on the natural immunity of the conjunctiva to pneumococcal infection.
GALLENGA. The phenomena of Roasenda in peripheral facial paralyses (insufficient convergence of the globe) and its genetic mechanism,

July-August, 1934.

ACCARDI. Further research on the effect of S.R.E. on the intra-ocular tension, albuminoid content and refractive index of the aqueous humour.
ROASENDA. A new mode of provocation (of P. Morin) and a particular pathological manifestation of the reaction of the pupil to light.
CARAMAZZA. On the gross pathological degeneration of the ocular globe.
ALIQUO-MAZZEI. Physiological anisocoria associated with the lateral movements of the glance.
GASPARRO. On the penetration into the anterior chamber of the eye by some medicaments instilled into the conjunctival sac.
VERZELLA. Characteristic physical chemistry of the ocular fluids.
VITTADINI. Contribution to the surgical treatment of high myopia.
GALLENGA. Advancement with tarsal graft of Müller's muscle in the pseudoptosis of enophthalmos.

Archivos de Oftalmologia Hispano-Americanos. *September, 1934.*

FILATOFF. The operative technique of partial penetrating transplantation of the cornea.
POYALES and MORENO. Hyaloscopia.

Revista de Ophthalmologia. *July, 1934.*

MARGENAT. A modern operation for cataract. Phakoerisis.
SPINOLA. Three cases of traumatic rupture of the iris.

Revista Oto-Neuro-Oftalmologica y de Cirurgia Neurologica.

October, 1934.

PAVIA. Detachment of the retina. Procedure for the localization and treatment of tears at the posterior pole.
PAVIA, DUSSELDORF and DURANDO. Strabismus. Its semi-operative correction, The myocampter and tenotomy. Considerations on the first 55 myocampter results.
PAVIA. Fundus of the eye. Cinematography. Cineretinography. New acquisitions with clinical accounts.